The Interactive Gauntlet

Pair of Linear Equations in Two Variables

Step up to the board. No answers are provided. Just logic, grit, and the stylus.

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The Crossnumber

ACROSS

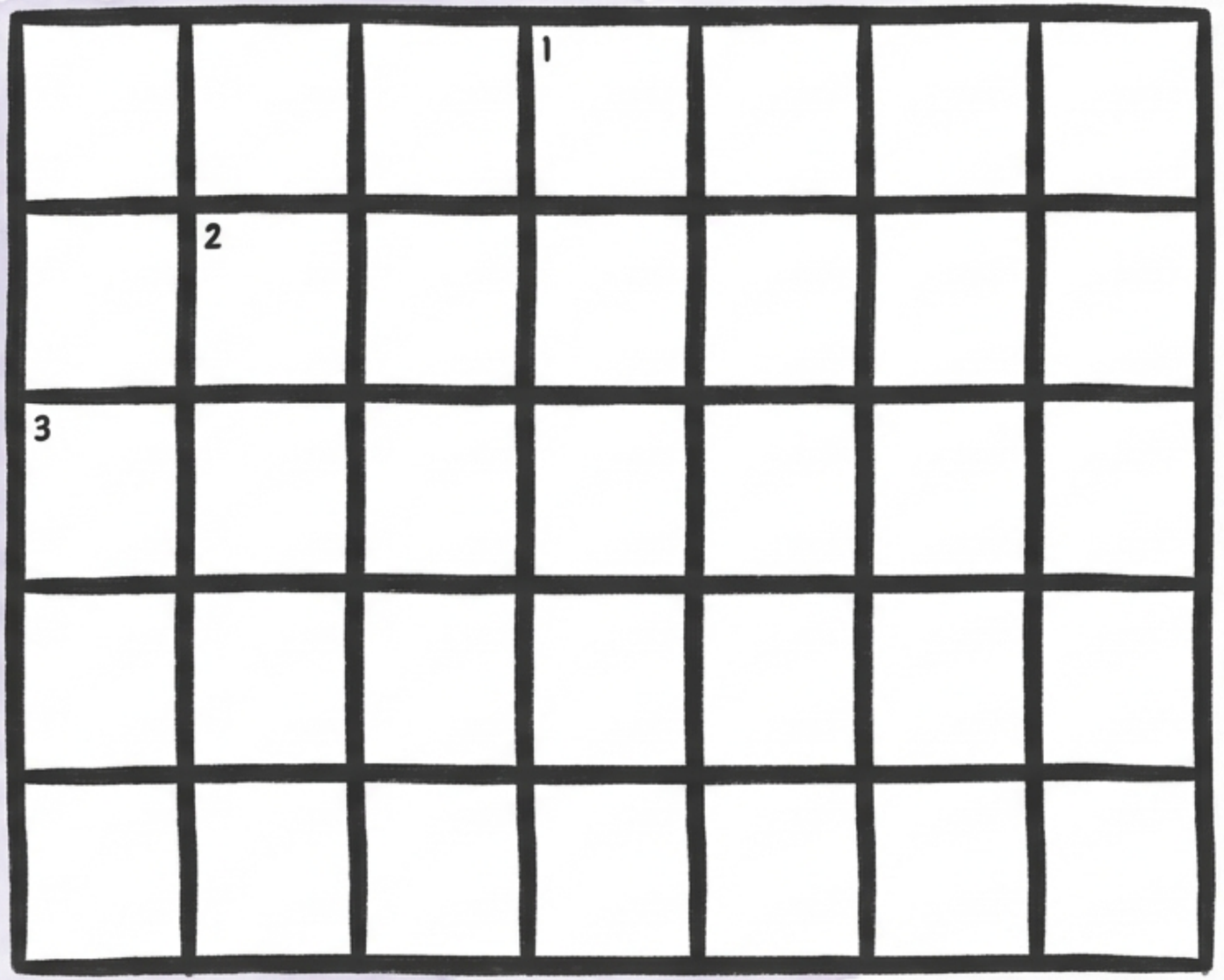
2. Monthly income of the first person, ratio 9:7 (Example 8) (5 digits)

3. The smaller two-digit number in the digit-reversal puzzle (Example 10) (2 digits)

DOWN

1. Monthly saving of each person (Example 8) (4 digits)

2. Monthly income of the second person, ratio 9:7 (Example 8) (5 digits)



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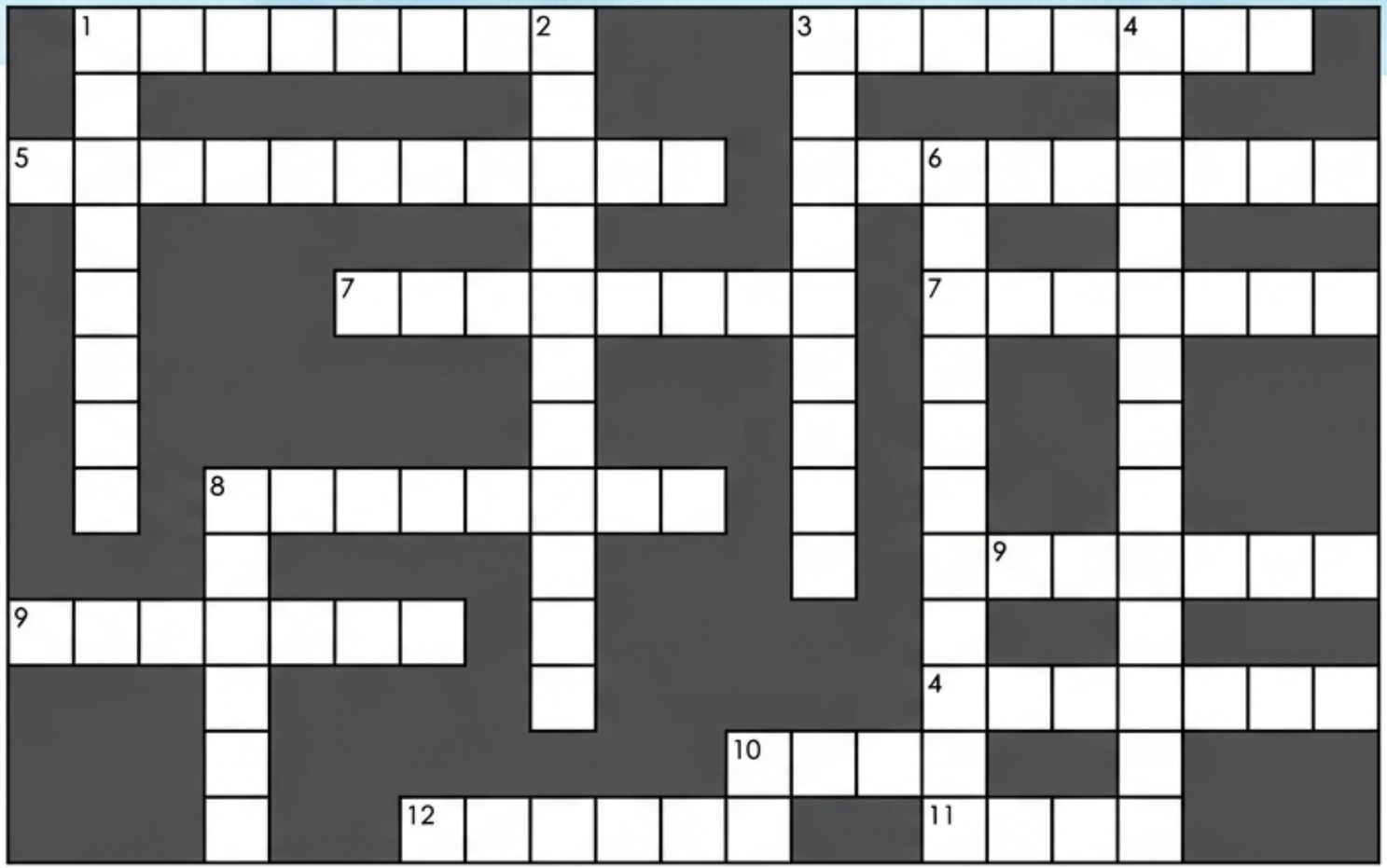
The Vocabulary Crossword



ACROSS

1. the number multiplying x or y in a linear equation (11)
5. the kind of solution given by intersecting lines (6)
7. algebraic method: express one variable in terms of the other, then plug in (12)
8. describes a pair of equations that has at least one solution (10)
9. the type of equation whose graph is always a straight line (6)

DOWN

2. lines that cross at exactly one point (12)
3. describes a pair of equations that has no solution (12)
4. algebraic method: make coefficients equal, then add or subtract (11)
6. lines that lie exactly on top of one another (10)

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Number Search

Work out each answer, then find it hidden in the grid (across, down, diagonally, or backwards).

1. The larger two-digit number in the reversal puzzle
2. The smaller two-digit number in the reversal puzzle
3. Sum of a number and its digit-reversal
4. Monthly income of the first person
5. Monthly income of the second person
6. Monthly saving of each person
7. Age of Aftab’s daughter
8. x-coordinate of B where the lines of Example 1 intersect

8	0	2	3	2	8	8	3	5	8	1	1	4	6
4	1	8	7	9	2	6	8	5	0	6	5	9	0
5	2	0	7	5	9	0	6	3	1	8	3	3	8
5	0	4	1	4	3	9	8	8	8	2	4	4	5
5	2	5	1	9	9	4	5	0	0	5	0	7	4
7	0	3	4	1	4	1	7	0	9	0	9	8	2
6	7	6	9	6	4	2	3	0	0	0	8	1	2
4	2	1	3	0	8	0	4	5	5	0	0	2	4
6	1	4	4	6	7	1	0	8	1	2	8	3	3
8	4	9	2	4	0	7	9	0	6	7	3	8	6
8	7	1	7	3	3	7	5	3	5	9	0	9	9
8	6	0	5	9	2	8	3	9	5	5	2	3	4
6	5	7	9	6	6	1	8	1	8	2	0	3	9
8	2	7	7	7	8	2	8	8	7	1	7	0	4

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Magic Square

Every row, column and diagonal adds to the same total.

8		
3	5	
4		2

Magic constant: 15. Fill the empty cells.

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Concept Bingo: Word Bank

Listen to the facilitator's clue. Step up and cross out the matching term.

Substitution	**Elimination**	**Consistent**	**Inconsistent**
Intersecting	**Parallel**	**Coincident**	**Dependent**
Unique Solution	**Graphical Method**	**Ratio Test**	**General Form**
Linear Equation	**Coefficient**	**Infinitely Many**	**No Solution**

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Spot the Mistake 1: Elimination

Step 1. Solve 9x - 4y = 2000 (1) and 7x - 3y = 2000 (2).
Multiply (1) by 3, (2) by 4:
27x - 12y = 6000 (3),
28x - 12y = 8000 (4).

Step 2. Adding (3) and (4) to eliminate y:
55x = 14000, so x = 254.5...

Step 3. So the incomes come out as non-round, unrealistic numbers.

The first wrong step is Step ____.

What should it say?

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Spot the Mistake 2: The Ratio Test

Step 1. For $2x + 3y - 9 = 0$ and $4x + 6y - 18 = 0$:
$a_1/a_2 = 2/4 = 1/2$,
$b_1/b_2 = 3/6 = 1/2$,
$c_1/c_2 = -9/-18 = 1/2$.

Step 2. All three ratios are equal, so the lines are parallel.

Step 3. Therefore the pair has no solution.

The first wrong step is Step ____.

What should it say?

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Spot the Mistake 3: Substitution Setup

Step 1. Solve $x + 2y = 3$ (1) and $7x - 15y = 2$ (2) by substitution.

Step 2. From (1): $x = 3 - 2y$. Substitute into (1) again to check: $(3 - 2y) + 2y = 3$, which gives $3 = 3$, so infinitely many solutions.

Step 3. Conclude the pair is dependent.

The first wrong step is Step ____.

What should it say?

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Quick-Fire Round: Match the Condition

1. $a_1/a_2 \neq b_1/b_2$
2. $a_1/a_2 = b_1/b_2 = c_1/c_2$
3. $a_1/a_2 = b_1/b_2 \neq c_1/c_2$
4. Substitution method
5. Elimination method
6. Dependent pair
7. False statement with no variable left (e.g., 0=9)

Express one variable in terms of the other, then plug in

Intersecting lines — unique solution

The pair is inconsistent

Parallel lines — no solution

Always consistent — infinitely many common solutions

Coincident lines — infinitely many solutions

Make one variable's coefficients equal, then add or subtract

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Quick-Fire Sprint: True or False?

1. A pair of equations that has no solution is called inconsistent. T F
2. A dependent pair of equations is always inconsistent. T F
3. If $a_1/a_2 \neq b_1/b_2$, the lines intersect at exactly one point. T F
4. If all three ratios are equal, the lines are parallel. T F
5. The graphical method is the most accurate way to find non-integer solutions. T F
6. In substitution, a true statement with no variable means infinitely many solutions. T F
7. In the elimination method, you must always eliminate x before y. T F
8. A pair of parallel lines represents an inconsistent pair of equations. T F
9. Every dependent pair of linear equations is consistent. T F
10. The equations $2x+3y=8$ and $4x+6y=7$ have a unique solution. T F

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Quick-Fire Sprint: Two Truths and a Lie

Set 1

(a) Intersecting lines give a unique solution. (b) Coincident lines give infinitely many solutions. (c) Parallel lines also give infinitely many solutions.

The lie is ____. Corrected: _____

Set 2

(a) A dependent pair is always consistent. (b) An inconsistent pair has no solution. (c) A consistent pair always has infinitely many solutions.

The lie is ____. Corrected: _____

Set 3

(a) In substitution, a false statement like $-4=0$ means no solution. (b) In elimination, coefficients must be made numerically equal before adding/subtracting. (c) The graphical and algebraic methods always give different answers for the same pair.

The lie is ____. Corrected: _____

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The Escape Challenge Finale

GATE 1 (Graph):
Solve x+3y=6 & 2x-3y=12 graphically.

Take the value of x at intersection.

GATE 2 (Ratio):
For x+2y-4=0 & 2x+4y-12=0.

Take the number of solutions (0, 1, or 9 for infinite).

GATE 3 (Substitution):
Solve x+2y=3 & 7x-15y=2.

Take the numerator of y.

GATE 4 (Elimination):
Solve 9x-4y=2000 & 7x-3y=2000.

Take x divided by 1000.

GATE 5 (Digit):
A 2-digit number and its reverse sum to 66, digits differ by 2.

Take tens digit of larger number.

EXIT CODE: [ ][ ][ ][ ][ ]

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